with the late weight gain in stapled patients. A procedure of gastric wrapping and placing of a nonabsorbable, permanent restricting sleeve around the stomach appears to have some advantages. The stomach is not penetrated, or sutured, thereby diminishing some of the early morbidities sometimes seen with the more invasive gastric techniques. The procedure is permanent and not associated with late weight gain.

With the gastric-reduction procedures, there do not appear to be the metabolic side effects that so often attended the earlier intestinal bypass procedures.

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Limb Salvage for Soft Tissue Sarcoma of the Extremities

SOFT TISSUE sarcomas of the extremities are unusual malignant tumors. Fewer than 4,000 cases of such tumors are treated annually in the United States. Amputation has been the standard therapy. In theory, amputation should be done one joint above the anatomic region involved by the sarcoma. In practice, however, even radical amputations such as hemipelvectomy or intrascapular thoracic amputation for large proximal lesions often result in close margins. Despite these radical amputations, the local recurrence rate can be as high as 10% with amputation alone.

Early attempts to surgically treat cases of soft tissue sarcoma by less than amputation resulted in high local failure rates. Local excision or enucleation of a tumor invariably cut through microscopic areas of disease. Soft tissue sarcoma appears grossly to be encapsulated. However, this "pseudocapsule" is composed of compressed normal tissue infiltrated by malignant cells. The enucleation or local excision leaves viable tumor cells in situ and will almost always lead to local recurrence.

Excision or compartmental resection can be successful in treating some patients with soft tissue sarcoma in an extremity. The theory of compartmental resection is to remove the entire involved muscle compartment from origin to insertion. In practice, this is often difficult because sarcomas are rarely confined to one muscle group. Most tumors cross several fascial planes and the tumor's site of origin remains obscure. Wide excision removes the tumor and a rim of normal tissue in an attempt to avoid transection of microscopic disease. Local recurrence after wide excision or compartmental resection may be as high as from 30% to 40%.

The development of radiotherapy has resulted in successful alternatives to amputation. Irradiation alone is inadequate to treat gross disease and must be combined with surgical resection to avoid dose-related complications or local recurrence. Irradiation is more likely to be effective when no gross disease remains. Resection of the tumor and postoperative radiotherapy are extremely successful for sarcomas located distal to the elbow or knee. Large, more proximal tumors cannot usually be successfully treated with resection and radiotherapy.

The addition of chemotherapy to the management of a primary tumor on an extremity has achieved local control rates at least as low as those of radical amputation. We infuse doxorubicin hydrochloride intraarterially because it is a known irradiation sensitizer. After three days of chemotherapy (total dose, 90 mg) a patient receives 3,500 rads of radiotherapy preoperatively over ten days. This rapid fractionation of radiotherapy results in few complications and is biologically equivalent to 5,000 rads. The tumor is then excised with a rim of surrounding normal tissue, liberally using frozen sections for confirmation of tumor-free margins. Wherever tumor abuts against bone, blood vessels or nerves, the respective periosteum, adventitia or perineurium is removed with the operative specimen.

Using this technique, 225 patients with soft tissue sarcoma of an extremity have been treated with a local control rate of greater than 94%. Serious complications requiring reoperation were uncommon and may be related to the dose of irradiation. Amputation is no longer the only method of therapy for soft tissue sarcoma of an extremity. Patients with soft tissue sarcomas of an extremity can be treated with a limb-preserving, multimodality approach that affords a higher local control rate than a surgical procedure alone and preserves a viable, functional extremity in 94% of cases. Additionally, survival is equivalent to that achieved with radical amputation.

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Ex Vivo Renal Artery Reconstruction

THIS YEAR RENAL FAILURE will develop in 15,000 persons, who will then require hemodialysis. With the increasing burden of hemodialysis, there is an impetus to develop new surgical techniques to revascularize kidneys affected by complex renovascular lesions. To salvage these kidneys and maintain renal function, conventional in situ methods are not appropriate, but ex vivo repair, a new technique, permits precise microvascular repair and avoids nephrectomy. "Bench work" surgical intervention describes the sequence of temporary nephrectomy, ex vivo renal perfusion and microvascular repair.

Many indications exist for an ex vivo repair. The most common is the reconstruction of lesions that affect the primary and secondary branch of the renal arteries. The most common cause of these distal lesions is fibromuscular dysplasia. Atherosclerotic renal artery aneurysms occur at this location in the renal artery as well. Additionally, several renal arteries in a donor kidney may require an ex vivo microvascular repair before transplantation. Less frequent indications include excision of bilateral renal parenchymal tumors or a tumor in a solitary kidney, repair of renal or ureteral injuries, removal of multiple or staghorn calculi and repair of a prior renal artery reconstruction that has failed.

The kidney is approached through either a midline or a flank incision with circumferential dissection of the renal artery and vein. After they are transected, the kidney is removed from the renal fossa and placed on continuous hypothermic perfusion on a dissecting platform. A reconstruction procedure can then be done in an asanguineous field, with optimal exposure and illumination, using microvascular surgical technique. Following repair, the kidney can be replaced in either an orthotopic or a heterotopic position in the iliac fossa. Although an autogenous saphenous vein is an acceptable graft for renal artery substitution, we prefer the branched hypogastric artery because of its anatomic configuration and size, its resistance to aneurysmal degeneration or stricture and its growth when implanted in a growing child.

Although most of the surgical literature on this subject comprises case reports, we have followed for periods of six months to six years 26 patients who underwent ex vivo repairs. Of 23 reconstructions, 22 were patent as determined by postoperative angiography. In all, 95% of the hypertensive patients were cured or their conditions improved during follow-up. Late postoperative arteriograms (more than three years) showed continuing patency in all six patients studied.

The ex vivo "bench work" operation, a relatively recent addition to vascular surgical procedures, has, by preserving kidneys and their important function, provided a significant contribution for patients affected with a variety of complex lesions.

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Preoperative Biliary Tract Drainage

DURING THE 1970S, numerous authors reported that percutaneous transhepatic drainage could be done with little morbidity. During this same period, surgical relief of obstruction in severely jaundiced patients was associated with postoperative morbidity in 40% to 60% and mortality in 15% to 25% of patients. For this reason, preoperative percutaneous transhepatic drainage has been recommended for these patients. Moreover, two retrospective studies from Japan and another nonrandomized analysis from Ohio State University suggested that preoperative biliary tract drainage might be helpful. Thus, on the basis of these retrospective studies, many clinicians have accepted that preoperative biliary drainage should be done routinely before surgical intervention in patients with deep jaundice. However, more recent reports from several institutions have cautioned that a significant proportion of patients undergoing this procedure are subject to both early and late complications.

Thus, controversy exists as to what role preoperative biliary drainage should play. To help answer this question, three prospective randomized studies have recently been completed. The first such study was done by Hatfield and associates from South Africa. These investigators failed to find any advantage in terms of decreased postoperative morbidity or mortality for preoperative percutaneous transhepatic drainage: 4 of 29 patients (14%) who had drainage and 4 of 28 (14%) who did not undergo drainage died. Five of the eight deaths, however, occurred in patients in whom either percutaneous transhepatic drainage could not be done (one patient) or who did not have a surgical procedure (five patients). The second study was done at the Hammersmith Hospital in London by McPherson and co-workers. In this study, of 65 patients, hospital mortality was actually higher in the drained (32%) than in the undrained (19%) patients ($P > .05$). Of 11 deaths in the drained group in this study, 5 occurred in patients who did not have an operation.

The third study was done at the UCLA Medical Center. In this study of 75 patients, hospital mortality was 8% among drained patients and only 5% in those patients who had surgical treatment without preoperative percutaneous transhepatic drainage. In both this study and the Hammersmith study, no significant differences in postoperative morbidity were noted between the drained and undrained patients. Moreover, in both of these studies the duration of hospital stay was significantly prolonged ($P < .05$) in the patients who had preoperative biliary tract drainage. Thus, although retrospective analyses suggested that preoperative percutaneous transhepatic drainage might be beneficial, prospective studies have not supported this early enthusiasm. One criticism of each of these prospective studies, however, is that the duration of preoperative drainage (10 to 18 days) may not have been sufficient to reverse the multiple metabolic and immunologic abnormalities associated with severe obstructive jaundice.

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Percutaneous Abscess Drainage and Related Radiologic Procedures

PERCUTANEOUS DRAINAGE PROCEDURES continue to evolve with new and innovative advances. Abscesses that previously were not considered appropriate for catheter drainage may be cured in some cases, while needle puncture of certain fluid collections and organs that had been assiduously avoided now is done safely and with clinical benefit. Progress has accrued from laboratory work, improvement in techniques and the necessity of application in desperately ill patients with no reasonable alternatives.

Unilocular (or bilocular) and relatively superficial abscesses are drained with catheters successfully in about 90% of cases. Because of superior resolution, computed tomography (CT) is used for guidance in most cases. The use of large, multihole sump systems, an adequate number of catheters and copious irrigation has now made this a routine procedure. Some hepatic abscesses, those in superficial abdominal